Formosa Journal of Sustainable Research (FJSR)
Vol.3, No.3, 2024: 555-568

# Profitability in Indonesia Manufacturing: Case Study on Automotive and Component Sector

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A R T I C L E I N F O

*Keywords:* Profitability, Liquidity, Size, Gearing Ratio, Manufacturing

*Received : 1 February*
*Revised : 19 February*
*Accepted: 21 March*



A B S T R A C T

This study aims to analyze and measure the extent to which liquidity ratio, firm's size, gearing ratio and market share affect the profitability on Indonesia manufacturing, case study with automobiles and components sector. The research method uses quantitative research with saturated samples 10 companies and the financial year period 2015-2020. Panel regression with common model effect regression analysed by Eviews10 software. This study show that liquidity ratio has a significant positive effect on profitability (proxy by return on assets, net profit margin and gross profit margin). Leverage with gearing ratio has a significant negative effect on profitability (proxied by net profit margin), while company size and market share have an effect on profitability, with smaller significance probability

DOI: https://doi.org/10.55927/fjsr.v3i3.8490
ISSN-E: 2830-6228
https://journal.formosapublisher.org/index.php/fjsr

## INTRODUCTION

A company's profitability and the factors that influence it are critical to all economic system actors, while its study became more important during the recent economic crisis. The European automotive sector is a dynamic sector and has a significant multiplier effect on the European economy. The automotive sector is closely related to other industrial sectors such as chemicals, energy, steel, textiles, information technology and so on, making it an extraordinary contribution to the economy (Basdekis et al., 2020). Identifying sources of variation in profitability at the corporate level is an important research theme in economics, both in strategic management and ccounting and finance (Goddard et al., 2005). As for some of the issues that explain the size of the company, age, capitalization, leverage debt, managerial efficiency and export orientation of the company affecting growth and profitability have resulted in theoretical and empirical research in economics and management, in order for a company to achieve market share, it must have adequate liquidity to expand its operations. Very high levels of liquidity can negatively affect a company's profitability (Voulgaris & Lemonakis, 2014).

Another thing that can affect profit is the size of the company. Company size is an important profitability factor, if companies benefit from economies of scale or scope when they expand, so it is expected that company size will be positively related to profits. Or if growth tends towards diseconomies of scale, the relationship between company size and profits can be negative (Goddard et al., 2005). However, firm size tends to have a weak statistical significance in influencing profitability this may be related to the sample size in their study (Basdekis et al., 2020). Although firms that increase in size tend to experience lower profits, market share can also be associated with an increase in average profitability. Profitability is also stated to be inversely proportional to the company's gearing ratio, but is positively related to liquidity. The gearing ratio itself, which is non-current liabilities plus loans divided by shareholder funds, high gearing benefits shareholders if profits exceed borrowing costs (Goddard et al., 2005).

The current economic crisis that has hit many countries in the world has caused setbacks in various sectors of the economy. In Indonesia, the real sector, which is expected to be able to sustain the downturn, has become powerless because many factories have been closed, producers have difficulty selling their products due to the reduced purchasing power of the people (Sitompul, 2002). The pandemic has had the impact of declining sales for companies that focus on manufacturing, especially in the automotive and components sub-sector. According to the Association of Automotive Component Manufacturers (ACMA), Micro, Small and Medium Enterprises (MSMEs) play a large role in the manufacture of automobile components, as they contribute more than 6 percent of the country's manufacturing GDP (Bhatt & Varghese, 2020).

Various previous studies have been carried out related to the topic of profitability, such as Basdekis, et al (2020) who conducted research on the profitability and optimal debt ratio of the car and spare parts sector in the Euro area with the results of the research that the firm's size variable had no effect on profitability. A similar study was also conducted by Tyagi & Mahajan (2022) who conducted research on profitability in the automobile industry in India which was inversely proportional to Basdekis' research (2020) where the firm's size variable had an effect on profitability (Tyagi & Mahajan, 2022). There is also Pervan et al. (2019) who conducted a study the determinant of company profitability in the manufacturing industry in Croatia with the results of liquidity effect on profitability (Pervan et al., 2019). All three extend Goddard's research.

This paper discusses the four main factors of manufacturing profitability in Indonesia with case study in the automotive and components sector, namely liquidity, company size, gearing ratio, and market share. The next section will discuss the theoretical review, research methodology, results, discussion, conclusions and further research.

## LITERATURE REVIEW

### Resource-Based Theory

The resource-based theory, primarily internal sources, is that organizational structure and management practices represent the main source of inter-firm performance heterogeneity. The strategic management literature emphasizes the role of firm-specific internal resources as determinants of variations in profitability (Barney, 2001; Peteraf, 1993).

A review of several literature shows that there are four main factors that will influence the profitability of manufacturing companies, namely business liquidity, company size, level of leverage in the form of gearing ratio, and market share. The four factors are described below.

### Liquidity and Profitability

Company liquidity (in the form of current assets divided by current liabilities) has a positive effect on profitability. High levels of liquidity reduce the risk of failing to meet short-term financial commitments. Liquidity can also make a company better able to adapt to changing circumstances, so that business liquidity has a positive effect on profitability (Goddard et al., 2005). The same thing was found by Mustafa et al (2019), where liquidity in the form of a quick ratio has a positive relationship with profitability (proxy by return on assets) in automobile industry in Pakistan. The quick ratio contains assets which is easily converted into cash in the short term so that the higher the level of liquidity, the more flexible the company is in funding business operations, so it will have a positive effect on the company's profitability (Mustafa et al., 2019).

**H1: Liquidity has a positive effect on profitability**

**Size and Profitability**

A positive relationship between company size and profitability will occur if the company benefits from economies of scale or economies of scope as it expands. But if growth tends toward diseconomies of scale, the relationship between size and profits can be negative. The nature of the relationship between company size and profits will be influenced by diversification, if diversification is the main driver of company growth and size in the long term (Baumol, 1959; Goddard et al., 2005).

**H2: Firm size has a positive effect on profitability**

**Leverage in Gearing Ratio and Profitability**

The gearing ratio is very important for evaluating a company's financial structure and bankruptcy risk. This ratio can take many forms, but usually examines the relative relationship between a company's debt, equity, and assets. Companies with fairly low leverage enjoy much higher profits than the market. Companies with low gearing have the opportunity to increase leverage in particular and this opportunity has strong value (Muradoglu et al., 2005).

The level of leverage in the form of a gearing ratio is non-current liabilities plus loans divided by shareholder equity. Companies with high gearing ratios tend to be at greater risk of not being able to meet interest and debt payment commitments. However, high gearing benefits shareholders if profits exceed borrowing costs. The strategic behaviour model emphasizes the importance of preparing a strategy. Established companies with low gearing may have an incentive to increase output, to exert downward price pressure, so that target competitors' profitability may have difficulty servicing their debt. Companies are very careful about decreased liquidity, as it prevents companies from undertaking valuable investment initiatives and may harm profitability. In a sample of UK companies, gearing levels reached historically high levels. This may have negative implications for growth and profitability (Goddard et al., 2005).

**H3: Gearing ratio has a negative effect on profitability**

**Market Share and Profitability**

Market share shows company revenue as a proportion of total industry revenue. In an industrial economics perspective, it shows a causal relationship between market share and profitability, because companies with large market power tend to develop anti-competitive strategies, which allow them to earn abnormal profits. In other words, market share is positively related to profitability probably reflecting the strong positive relationship between productive efficiency and firm size. The most efficient companies earn the highest levels of profit, and their success will allow them to grow and gain a relatively large share of the market (Goddard et al., 2005).

**H4: Market share has a positive effect on profitability**

The summary of the review of several literatures is summarized into a conceptual framework for discussing the profitability of automotive manufacturing in Indonesia in **Figure 1.**

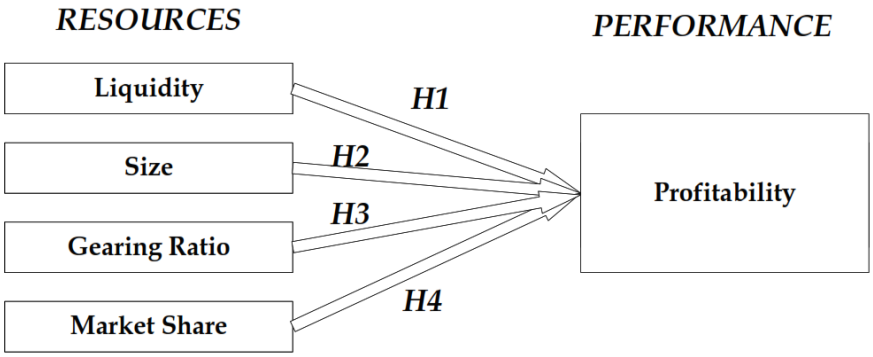


Figure 1. Conceptual Framework for Profitability in Indonesia Manufacturing

## METHODOLOGY

### Data and Sample

This research is a case study of manufacturing in the automotive and components sub-sector on the Indonesia Stock Exchange for the 2016-2020 period. With the saturated sample approach, all companies are sampled. The sample consisted of eleven companies, namely Astra International, Astra Otoparts, Garuda Metallindo, Indo Kordsa, Goodyear Indonesia, Gajah Tunggal, Indomobil Sukses International, Indospring, Nipress, Prima Alloy Steel Universal, and Selamat Selamat. However, there is one company (Nipress) whose data is incomplete, so the amount of data used is 50 observations.

### Empirical Model

The empirical model for determining automotive manufacturing profitability is estimated using panel data (pooled cross-sectional and time-series) in Indonesia. The empirical model specification is in the form,

$$\boldsymbol{PROFIT_{it} = \beta_0 + \beta_1 LIQ_{it} + \beta_2 SIZE_{it} + \beta_3 GEAR_{it} + \beta_4 SHARE_{it} + \varepsilon_{it}} \qquad (1)$$

The dependent variable in equation 1, for profitability of company $\boldsymbol{i}$ and year $\boldsymbol{t}$ is $\boldsymbol{PROFIT_{i,t}}$ measured in three proxies, namely return on assets (ROA), net profit margin (NPM), and gross profit margin (GPM), summarized in **Table 1**. ROA is the ratio of net profit before tax plus interest divided by total assets. NPM as net income divided by total revenue. GPM as gross income divided by total revenue. The independent variables consist of liquidity, company size, gearing ratio, and market share. A summary of the descriptive values is presented in **Table**.

Table 1. Variables Definition and Measurements

| Variables | Measurement | Source |
|---|---|---|
| **Dependent Variable** | | |
| Profitability | | |
| ROA (proxy 1) | net profit before tax plus interest divided by total assets | Annual report |
| NPM (proxy 2) | net income divided by total revenue | Annual report |
| GPM (proxy 3) | gross income divided by total revenue | Annual report |
| **Independent Variable** | | |
| Liquidity (LIQ) | The quick ratio is current assets other than inventory divided by current liabilities | Annual report |
| Size | the natural logarithm of total assets | Annual report |
| Gearing | Non-current liabilities plus loans divided by shareholder funds | Annual report |
| Market share | the company's revenues as a proportion of the industry's total revenues | Annual report |

## RESEARCH RESULT

### Data Description

The descriptive statistics of liquidity (LIQ), company size (SIZE), gearing ratio (GEAR), market share (SHARE), and three profitability proxies in the form of return on assets (ROA), net profit margin (NPM), and gross profit margin (GPM), presented in **Table 2**. Liquidity in the form of a quick ratio with an average of 118.48 percent shows the company's ability to recover its short-term liabilities. Company size is measured by the natural ratio of total assets, indicating the company's economic scale or scope. Gearing ratio or leverage ratio shows the company's capital structure. The gearing ratio is the percentage of net debt from total equity with an average of 58.72 percent, indicating a moderate capital structure. Market share measures the strength a company has when facing competition in the market. Astra International has a 72 percent share of the main market, while nine others only 5 percent or below. The profitability of automotive companies is very high with a large gross profit margin with an average of 18.37 percent, in the form of net profit margin with an average of 3.1 percent, and in the form of return on assets with an average of 4.13 percent.

Table 2. Descriptive Statistics

| | $LIQ_{i,t}$ | $SIZE_{i,t}$ | $GEAR_{i,t}$ | $SHARE_{i,t}$ | $ROA_{i,t}$ | $NPM_{i,t}$ | $GPM_{i,t}$ |
|---|---|---|---|---|---|---|---|
| Mean | 1.1848 | 15.7437 | 0.5872 | 0.0999 | 0.0413 | 0.0310 | 0.1837 |
| Median | 1.0027 | 15.0605 | 0.3206 | 0.0159 | 0.0335 | 0.0391 | 0.1858 |
| Maximum | 3.5714 | 19.6790 | 4.6397 | 0.8010 | 0.2300 | 0.1600 | 0.3200 |
| Minimum | 0.3043 | 13.9499 | -0.4890 | 0.0012 | -0.0749 | -0.4200 | 0.0706 |
| Observations | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

Source: Eviews 10 Output

To avoid data outliers, cleansing treatment was carried out. Outlier data is data whose characteristics are unique and very much different from other observations, in the form of extreme values of a univariate or multivariate variable. For the case of small samples, the data is converted into Z scores, and Z scores with values greater than 2.5 are said to be outliers (Ghozali and Ratmono, 2020). Outlier data can cause serious problems in statistical analysis. Data with 50 observations in this study contained 4 outliers so the total number of observations was 46.

**Manufacturing Profitability Analysis with ROA (Proxy 1)**

The best panel models are three types of common effect models, fixed effect models, and random effect models. The Chow test uses the F test to choose between a common effect model or a fixed effect model, and recommends a fixed effect model if the significance of the F test is less than 0.05. The Hausman test is used to choose between a random effect model or a fixed effect model, and recommends a fixed effect model if the significance of the Hausman test is less than 0.05. Langrange Multiplier test to choose between a common effect model or a random effect model, and recommends a random effect model if the significance of the Langrange test is less than 0.05.

Selecting the appropriate panel regression model was carried out by the Chow test, Hausman test and Lagrange Multiplier test in **Table 3**. The probability value in Cross section F is 0.0000 and is smaller than alpha 0.05, so the suitable model is panel regression with fixed effects. The probability value in the Random Cross section is 0.20 and is greater than alpha 0.05, so the suitable model is panel regression with random effects. The Breusch-Pagan probability value in the one-sided cross-section is 0.2927 and is greater than alpha 0.05, so the suitable model is panel regression with common effects. Based on the three tests, the model with ROA profitability uses panel regression with common effects.

To ensure that the classical assumption requirements for the first proxy profitability model (ROA) are met, testing are carried out for residual normality, residual autocorrelation, heteroscedasticity and multicollinearity, which are presented in **Table 4**. If the Jarque Bera probability value is greater than alpha 0.05 then the model residuals are normally distributed. The presence of autocorrelation was carried out using the Durn-Watson (DW) test. If the DW

value lies between dU (1.67385) and 4-dU (2.32615), then the model does not experience autocorrelation. DW is 0.9307, so there is autocorrelation between residual. With the Glacier test, if the probability is above 0.05, the panel regression model is free from heteroscedasticity. Panel data shows that it is free from heteroscedasticity. The model is free from multicollinearity problems if the variation inflation factor (VIF) value is less than 10. Panel data shows that it is free from multicollinearity problems (Ghozali and Ratmono, 2020).

**Manufacturing Profitability Analysis with Net Profit Margin (Proxy 2 NPM)**

Selecting the appropriate panel regression model for NPM was carried out by the Chow test, Hausman test and Lagrange Multiplier test in **Table 5**. The results of the Chow test produce a probability above 0.05, so it is better to use the common effects model rather than fixed effects. The LM test results produce a probability of more than 0.05 so it is better to use the common effects model rather than random effects model.

Table 3. Profitability Analysis (Proxy 1 ROA): Choose a Common Effect, Fixed Effect, or Random Effect Model

| | **Chow Test** Redundant Fixed Effects Tests | | Correlated Random Effects - **Hausman Test** | | **Lagrange multiplier** (LM) **test** for panel data | |
|---|---|---|---|---|---|---|
| | Statistic | Prob | Statistic | Prob | Statistic | Prob |
| Cross-section F | 6.300071 | 0.0000 | | | | |
| Cross-section Chi-square | 46.898435 | 0.0000 | | | | |
| Cross-section random (Chi-sq) | | | 5.987966 | 0.2000 | | |
| Breusch-Pagan (Cross-section One-sided ) | | | | | 1.107029 | 0.2927 |

*Source*: Eviews 10 Output

Table 4. (Proxy 1 ROA): Testing Residual Normality, Residual Autocorrelation, Heteroscedasticity and Multicollinearity

| | **Normality Test** | | **Autocorrelation Test (DW)** | **Glacier test** | | **Variance Inflation Factors (VIF)** | |
|---|---|---|---|---|---|---|---|
| Test/Var | Statistic | Prob | | Coefficient | Prob | Coefficient Variance | Centered VIF |
| Jarque-Berra | 2.254514 | 0.3239 | | | | | |
| Durbin-Watson stat | | | 0.930743 | | | | |
| C | | | | 0.051948 | **0.2051** | 0.012943 | NA |
| LIQ | | | | 0.011923 | **0.1655** | 0.000191 | **1.2202** |
| SIZE | | | | -0.002445 | **0.3637** | 5.95E-05 | **3.8203** |
| GEAR | | | | -0.005678 | **0.2682** | 0.000252 | **1.4512** |
| SHARE | | | | -0.002451 | **0.8864** | 0.003602 | **3.7746** |

Table 5. Profitability Analysis (Proxy 2 NPM): Choose a Common Effect, Fixed Effect, or Random Effect Model

| | **Chow Test** Redundant Fixed Effects Tests | | Correlated Random Effects - **Hausman Test** | | **Lagrange multiplier** (LM) **test** for panel data | |
|---|---|---|---|---|---|---|
| | Statistic | Prob | Statistic | Prob | Statistic | Prob |
| Cross-section F | 1.056284 | 0.4199 | | | | |
| Cross-section Chi-square | 11.965310 | 0.2153 | | | | |
| Cross-section random (Chi-sq) | | | 5.095164 | 0.2777 | | |
| Breusch-Pagan (Cross-section One-sided ) | | | | | 5.903553 | 0.1510 |

To ensure that the classical assumption requirements for the second proxy profitability model (NPM) are met, testing are carried out for residual normality, residual autocorrelation, heteroscedasticity and multicollinearity, which are presented in **Table 6.** The residuals in the profitability model with NPM are normally distributed, because the Jarque-Berra probability is more than 0.05. Residual autocorrelation also does not occur in the NPM profitability model because the DW statistic is smaller than 2.57941 (or 4-dL). The residual NPM profitability model is also free from heteroscedasticity problems because the Glacier test probability is more than 0.05. The NPM profitability model also does not experience multicollinearity because the VIF value is smaller than 10.

Table 6. (Proxy 1 NPM): Testing Residual Normality, Residual Autocorrelation, Heteroscedasticity and Multicollinearity

| | **Normality Test** | | **Autocorrelation Test (DW)** | **Glacier test** | | **Variance Inflation Factors (VIF)** | |
|---|---|---|---|---|---|---|---|
| Test/Var | Statistic | Prob | | Coefficient | Prob | Coefficient Variance | Centered VIF |
| Jarque-Berra | 1.302301 | 0.5214 | | | | | |
| Durbin-Watson stat | | | 1.240706 | | | | |
| C | | | | 0.074584 | **0.1143** | 0.030158 | **NA** |
| LIQ | | | | -0.003714 | **0.3341** | 0.000159 | **1.220191** |
| SIZE | | | | -0.003298 | **0.2940** | 0.000134 | **3.820272** |
| GEAR | | | | -0.001395 | **0.8267** | 0.000477 | **1.451241** |
| SHARE | | | | 0.008256 | **0.7270** | 0.008539 | **3.774575** |

**Manufacturing Profitability Analysis with Gross Profit Margin (Proxy 3 GPM)**

Selecting the appropriate panel regression model for GPM was carried out by the Chow test, Hausman test and Lagrange Multiplier test in **Table 7**. The results of the Chow test produce a probability less than 0.05, so it is better to use the fixed effects model rather than common effects. The Hausman test results produce a probability of more than 0.05 so it is better to use the random effects model rather than fixed effects model.

Table 7. Profitability Analysis (Proxy 3 GPM): Choose a Common Effect, Fixed Effect, or Random Effect Model

| | **Chow Test** Redundant Fixed Effects Tests | | Correlated Random Effects - **Hausman Test** | | **Lagrange multiplier** (LM) **test** for panel data | |
|---|---|---|---|---|---|---|
| | Statistic | Prob | Statistic | Prob | Statistic | Prob |
| Cross-section F | 12.136735 | 0.0000 | | | | |
| Cross-section Chi-square | 69.740198 | 0.0000 | | | | |
| Cross-section random (Chi-sq) | | | 2.178155 | 0.7030 | | |
| Breusch-Pagan (Cross-section One-sided ) | | | | | 39.80928 | 0.0000 |

To ensure that the classical assumption requirements for the third proxy profitability model (GPM) are met, testing are carried out for residual normality, residual autocorrelation, heteroscedasticity and multicollinearity, which are presented in **Table 8.** The residuals in the profitability model with GPM are normally distributed, because the Jarque-Berra probability is more than 0.05. Residual autocorrelation also does not occur in the NPM profitability model because the DW statistic is smaller than 2.57941 (or 4-dL). The residual NPM profitability model is also free from heteroscedasticity problems because the Glacier test probability is more than 0.05. The NPM profitability model also does not experience multicollinearity because the VIF value is smaller than 10.

Table 8. (Proxy 3 GPM): Testing Residual Normality, Residual Autocorrelation, Heteroscedasticity and Multicollinearity

| | **Normality Test** | | **Autocorrelation Test (DW)** | **Glacier test** | | **Variance Inflation Factors (VIF)** | |
|---|---|---|---|---|---|---|---|
| Test/Var | Statistic | Prob | | Coefficient | Prob | Coefficient Variance | Centered VIF |
| Jarque-Berra | 2.988117 | 0.2245 | | | | | |
| Durbin-Watson stat | | | 0.788802 | | | | |
| C | | | | 0.074584 | **0.1143** | 0.030158 | **NA** |
| LIQ | | | | -0.003714 | **0.3341** | 0.000159 | **1.3061** |
| SIZE | | | | -0.003298 | **0.2940** | 0.000134 | **3.4539** |
| GEAR | | | | -0.001395 | **0.8267** | 0.000477 | **1.4068** |
| SHARE | | | | 0.008256 | **0.7270** | 0.008539 | **3.4501** |

## DISCUSSION

The appropriate panel model for the three manufacturing profitability proxies is the common effects model, as shown in **Table 9**. The model simultaneously influences profitability on the three profitability proxies, with a probability F value below 0.01.

Table 9. Determinants for Manufacturing Profitability

| | Dependent Varible ROA | | Dependent Varible NPM | | Dependent Varible GPM | |
|---|---|---|---|---|---|---|
| | Statistic | Prob | Statistic | Prob | Statistic | Prob |
| Independent Variables | | | | | | |
| C | -0.2933 | 0.1676 | -0.2933 | 0.0875 | 0.1837 | 0.0934 |
| LIQ | 0.0866 | 0.0203** | 0.0866 | 0.0001*** | 0.0909 | 0.0000*** |
| SIZE | 0.0169 | 0.0114** | 0.0169 | 0.1439 | -0.0081 | 0.2701 |
| GEAR | -0.0651 | 0.0234** | -0.0651 | 0.0081*** | 0.0457 | 0.0039*** |
| SHARE | 0.0070 | 0.0884* | 0.0071 | 0.9364 | 0.1043 | 0.0717* |
| R-squared | 0.5515 | | 0.5515 | | 0.5537 | |
| Adjusted R-squared | **0.5077** | | **0.5077** | | **0.5101** | |
| F-statistic | 12.604 | | 12.604 | | 12.715 | |
| Prob(F-statistic) | 0.0000 | | 0.0000 | | 0.0000 | |

*Notes*: *** Significance at Alpha 0.01, ** Significance at Alpha 0.05, * Significance at Alpha 0.10

Liquidity as measured by the quick ratio has a significant positive effect on manufacturing profitability in all three profitability proxies. These findings support the findings of Goddard et al. (2005) in European Manufacturing and Mustafa et al (2019) in Pakistani automobiles. Indonesian automotive companies must maintain their liquidity levels in order to generate business profitability.

Firm size is a measure of the company's strength in developing its business. Firm size has a positive and only significant effect on the ROA proxy, supporting the findings of Goddard et al. (2005) and Basdekis et al. (2020). Profitability proxies in the form of NPM and GPM are not significant, also supporting the findings of Pervan et al, (2019) in Croatian manufacturing. The implication is that large automotive companies such as Astra International and other small automotive companies in creating profitability are not as strong as liquidity factors.

The leverage ratio in the form of the gearing ratio has a negative effect on manufacturing profitability in the three profitability proxies. These findings support the findings of Goddard et al. (2005) in European manufacturing as well as Basdekis et al. (2020) in the European automotive sector. This finding implies that companies with a higher portion of debt will experience downward pressure on profitability, because the portion of debt payments will increase.

Market share as a measure of a company's monopoly power. The higher the company's market share, the more freedom the company has in offering products or promotions so that it wins competition from other companies. Market share has a positive and significant effect on the ROA and GPM profitability proxies with a lower alpha level (10%). The profitability of Indonesian automotive manufacturing is affected by market share but not as strongly as the company's liquidity.

## CONCLUSIONS AND RECOMMENDATIONS

Identifying the factors that influence profitability is very important for companies and academics. The profitability of Indonesian manufacturing is strongly influenced by the company's liquidity level, as seen in the profitability proxies ROA, NPM and GPM. The second factor of profitability is the level of gearing ratio leverage. A company that has a higher gearing ratio means that its debt portion is higher, so it will pay a larger portion of debt interest, and this has implications for decreasing profits, which is significant for the ROA, NPM and GPM profitability proxies.

Company size only has a significant positive effect on profitability proxy ROA. Business capacity and breadth of business fields have a positive effect on profitability but are weaker than liquidity and gearing ratios. Market share also has a weaker positive effect on profitability than liquidity and gearing ratios.

## FURTHURE STUDY

This research is still limited to the financial segment, namely liquidity, company size, gearing ratio and market share. Further research can explore this from a strategic management approach or other industrial economic approaches. Comparisons with other sectors will also add benefits in analyzing manufacturing profitability.

## ACKNOWLEDGMENT

The research is a summary of Rimadhani's thesis at the Faculty of Economics and Business, Perbanas Institute. An initial version of the paper was presented at the Perbanas National Seminar (SNAP) but has not been published.

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